FIG.1

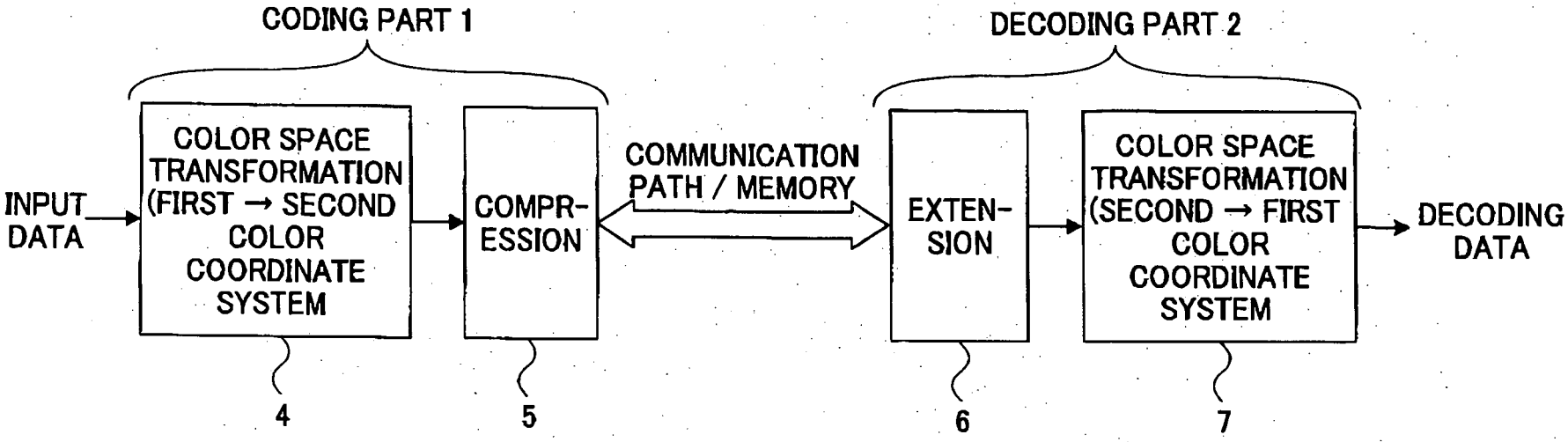

CODING PART 1
DECODING PART 2
INPUT DATA
COLOR SPACE TRANSFORMATION (FIRST → SECOND COLOR COORDINATE SYSTEM
COMPR-ESSION
COMMUNICATION PATH / MEMORY
EXTEN-SION
COLOR SPACE TRANSFORMATION (SECOND → FIRST COLOR COORDINATE SYSTEM
DECODING DATA
4
5
6
7

FIG.2

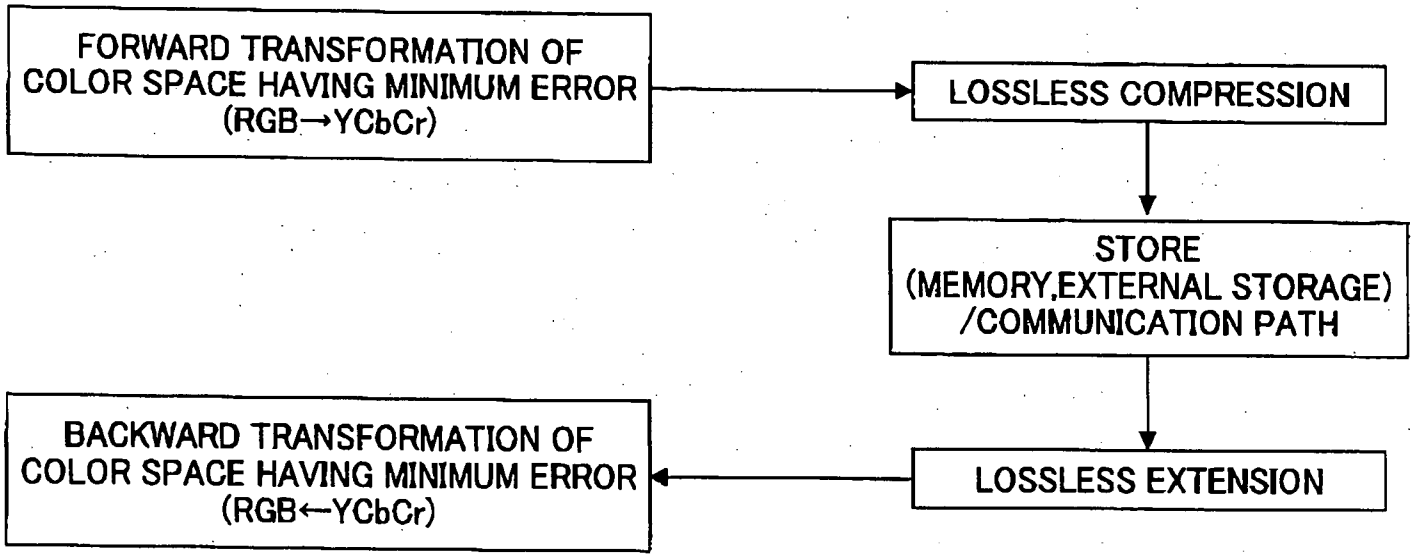

FORWARD TRANSFORMATION OF COLOR SPACE HAVING MINIMUM ERROR (RGB→YCbCr)
LOSSLESS COMPRESSION
STORE (MEMORY,EXTERNAL STORAGE) /COMMUNICATION PATH
LOSSLESS EXTENSION
BACKWARD TRANSFORMATION OF COLOR SPACE HAVING MINIMUM ERROR (RGB←YCbCr)

FIG.3

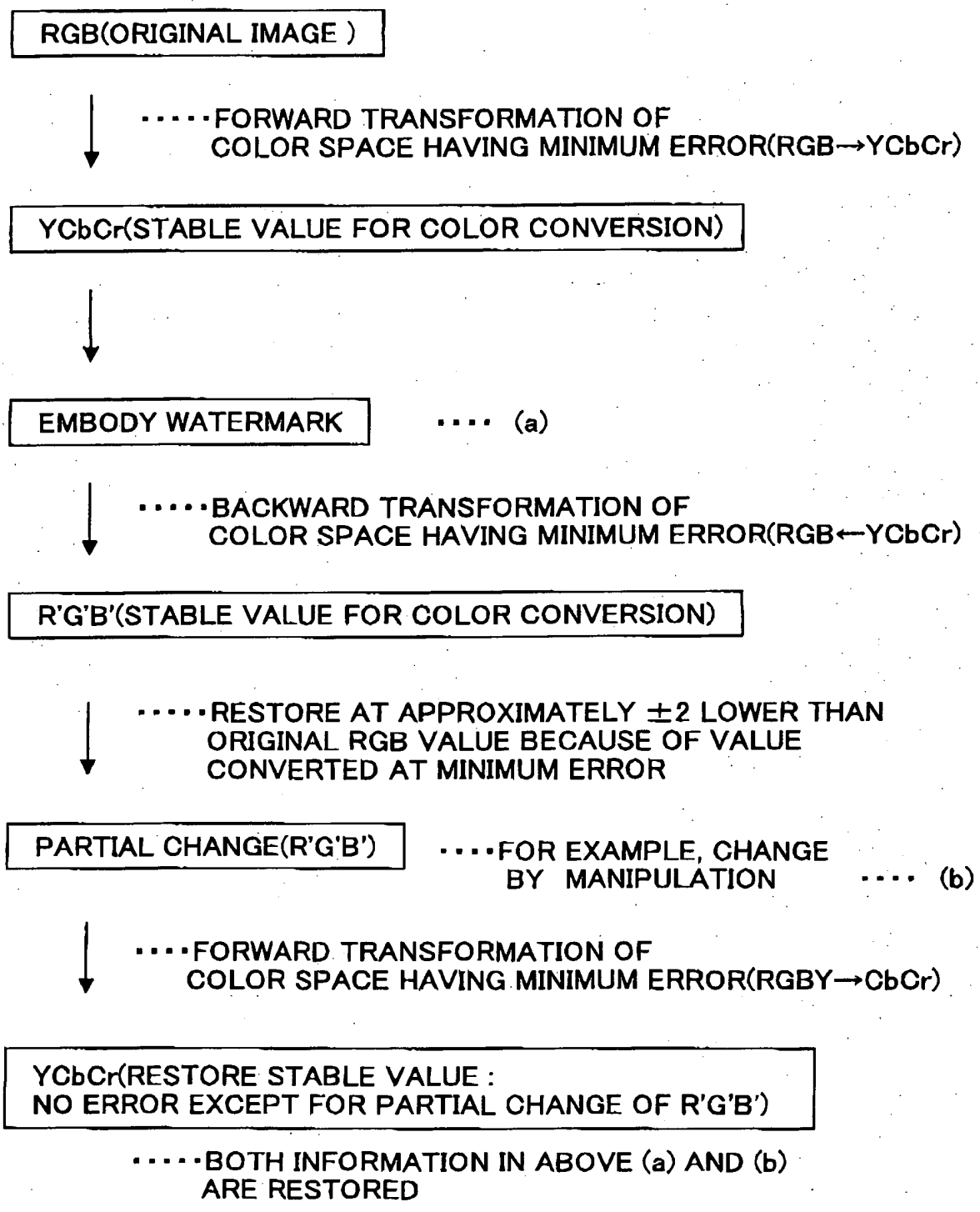

RGB(ORIGINAL IMAGE)
·····FORWARD TRANSFORMATION OF COLOR SPACE HAVING MINIMUM ERROR(RGB→YCbCr)
YCbCr(STABLE VALUE FOR COLOR CONVERSION)
EMBODY WATERMARK
···· (a)
·····BACKWARD TRANSFORMATION OF COLOR SPACE HAVING MINIMUM ERROR(RGB←YCbCr)
R'G'B'(STABLE VALUE FOR COLOR CONVERSION)
·····RESTORE AT APPROXIMATELY ±2 LOWER THAN ORIGINAL RGB VALUE BECAUSE OF VALUE CONVERTED AT MINIMUM ERROR
PARTIAL CHANGE(R'G'B')
····FOR EXAMPLE, CHANGE BY MANIPULATION ···· (b)
····FORWARD TRANSFORMATION OF COLOR SPACE HAVING MINIMUM ERROR(RGBY→CbCr)
YCbCr(RESTORE STABLE VALUE : NO ERROR EXCEPT FOR PARTIAL CHANGE OF R'G'B')
·····BOTH INFORMATION IN ABOVE (a) AND (b) ARE RESTORED

FIG.4

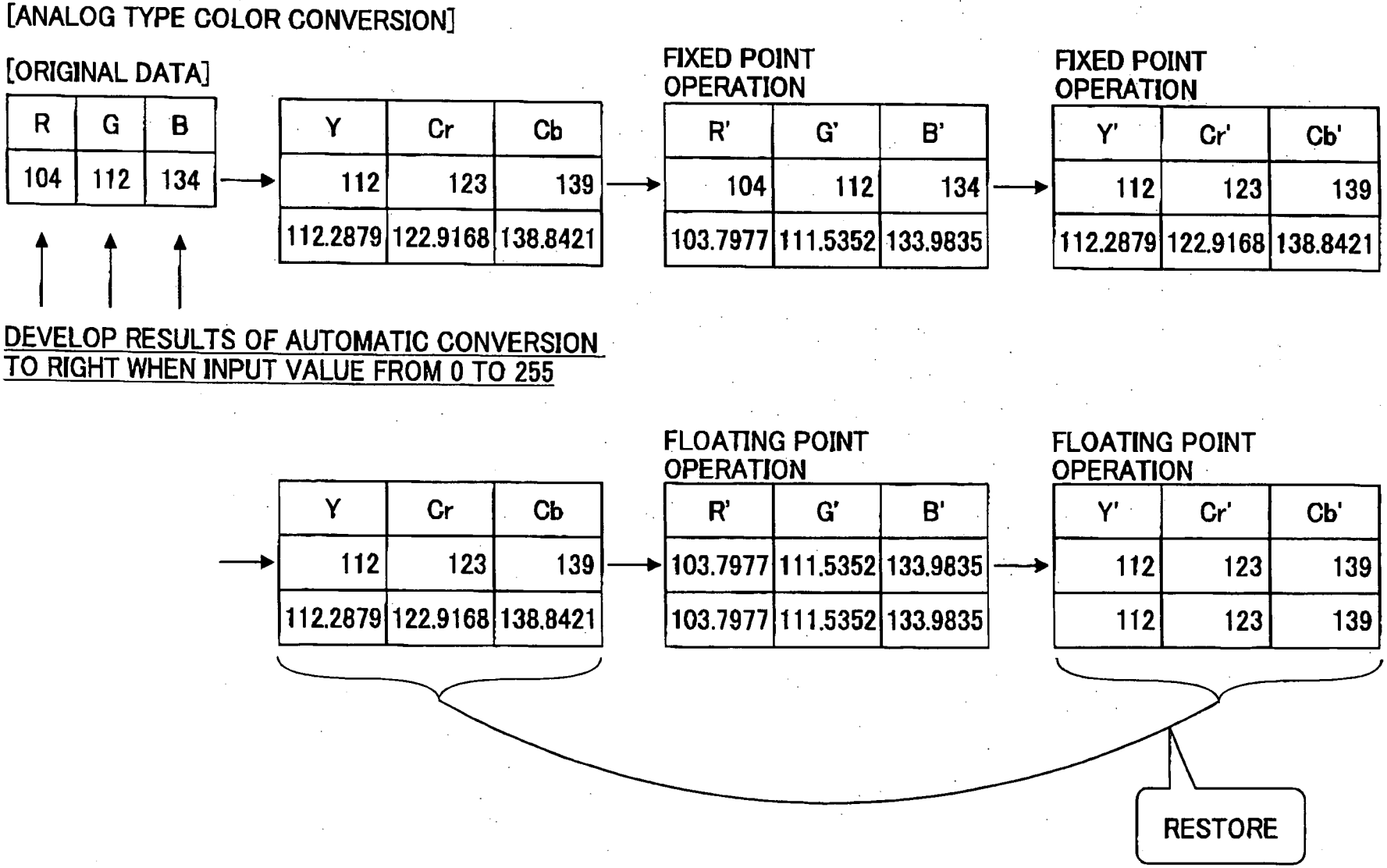

[ANALOG TYPE COLOR CONVERSION]
[ORIGINAL DATA]
R G B
104 112 134
Y Cr Cb
112 123 139
112.2879 122.9168 138.8421
FIXED POINT OPERATION
R' G' B'
104 112 134
103.7977 111.5352 133.9835
FIXED POINT OPERATION
Y' Cr' Cb'
112 123 139
112.2879 122.9168 138.8421
DEVELOP RESULTS OF AUTOMATIC CONVERSION TO RIGHT WHEN INPUT VALUE FROM 0 TO 255
Y Cr Cb
112 123 139
112.2879 122.9168 138.8421
FLOATING POINT OPERATION
R' G' B'
103.7977 111.5352 133.9835
103.7977 111.5352 133.9835
FLOATING POINT OPERATION
Y' Cr' Cb'
112 123 139
112 123 139
RESTORE

FIG.5

[DIGITAL TYPE COLOR CONVERSION USING ITU-R BT.601]

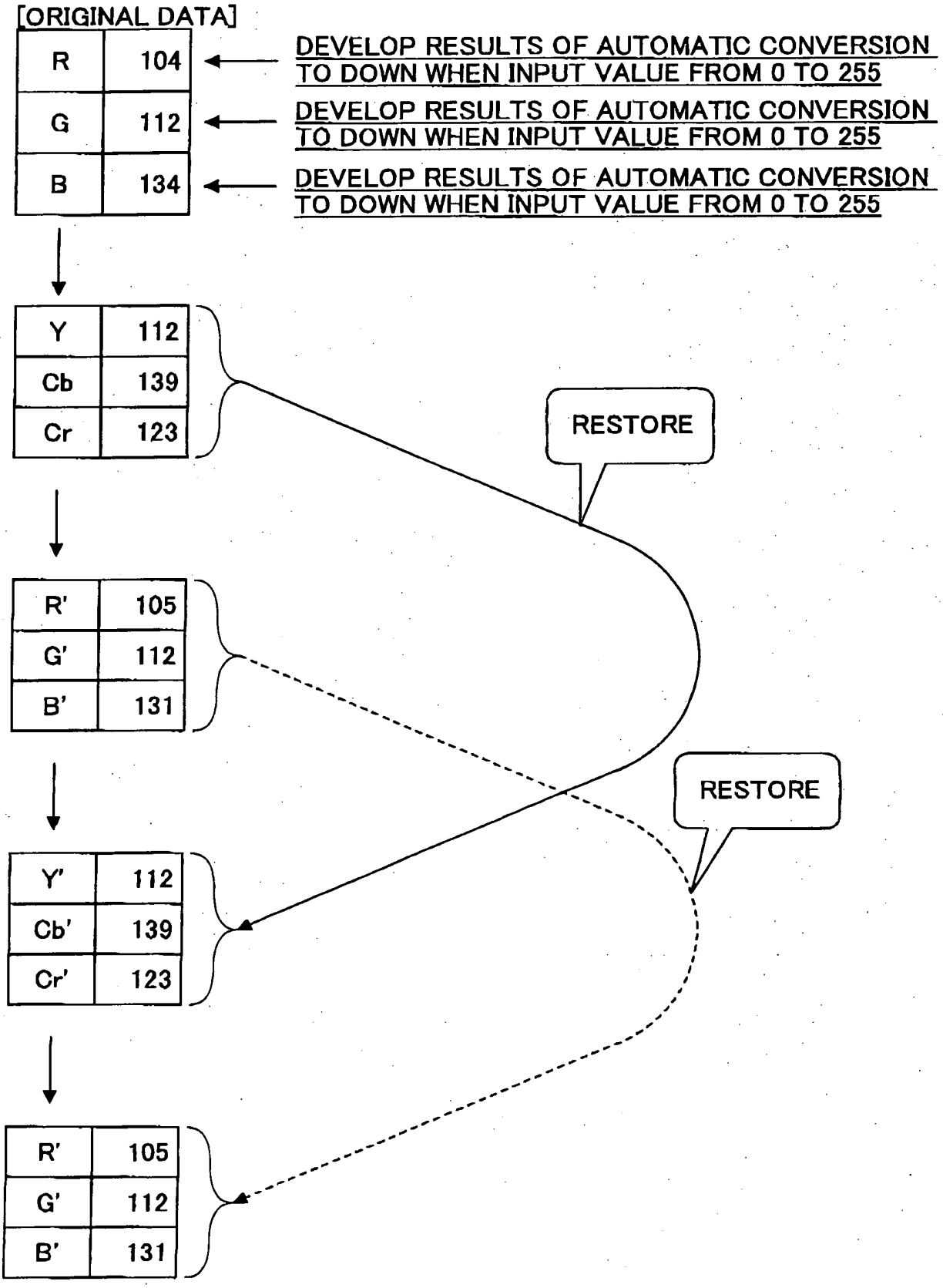
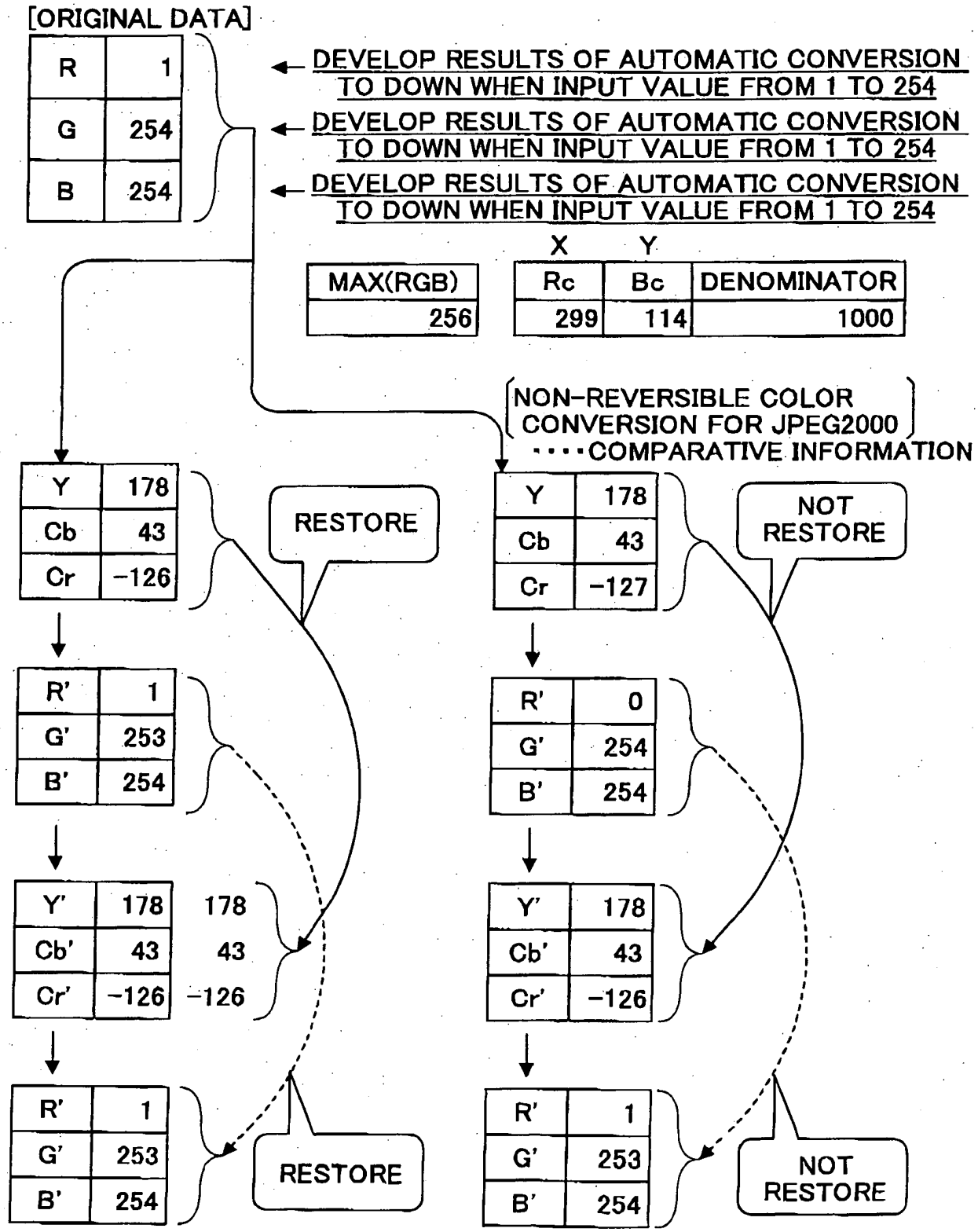


FIG.6

[REVERSIBLE TRANSFORMATION OF Y/Cb/Cr → R/G/B FOR MLC]